CAL ROOM
L LIBRARY
OF MICH.

JUN 12 19

SCHOOL AND SOCIETY

EDITED BY J. McKEEN CATTELL

Volume XXIX SATURDAY, JUNE 15, 1929 Number 755

CONTENTS

The Philosophy and Organization of Research: B. R. BUCKINGHAM 755

Research in Child Development: ARNOLD GESELL 765

Educational Events:
Public Playing Fields in Holland; Education in Ontario; The Rockefeller Foundations; The Ditson Bequest to Musical Education; The Nursery School of Western Reserve University; Guggenheim Exchange Fellowships between the United States and Latin-America; American Home Economics Association; Troubles at Clarkson College of Technology; Retirement of Members of the Faculties of the University of Chicago 767

Educational Notes and News 772

Discussion:
Concerning Overlapping of Professional Courses in Teacher-training Institutions: LILIAN HUNSICKER. *The Ethical Training of Children:* EMILY RAY GREGORY 776

Special Correspondence:
The Virginia Polytechnic Institute's Service to the State: R. H. McNEIL 779

Reports:
The Relations of the National Government to Education 781

Quotations:
The Government and Education; Inter-American Education 783

Educational Research and Statistics:
Elusive Factors Tending to Reduce Correlations between Intelligence Test Ranks and College Grades: FRANK S. FREEMAN 784

$5.00 A YEAR PUBLISHED WEEKLY 15 CENTS A COPY

THE SCIENCE PRESS

LANCASTER, PA. GARRISON, N. Y.

GRAND CENTRAL TERMINAL, NEW YORK CITY

Entered as second-class matter August 15, 1923, at the Post Office at Lancaster, Pa., under the Act of March 3, 1879

Fisk TEACHERS AGENCY 28 EAST JACKSON BLVD. **CHICAGO**
Address Dept. N

C. E. GOODELL, President and General Manager

Selective Service ranging from Primary Teachers to College Presidents. School officials as well as teachers will find the personal, sympathetic understanding of their needs a valuable enlargement of the recognized proficiency of this Agency. Write for details.

INSTRUCTORS AND PROFESSORS WANTED

College service our specialty.

Many calls for those with the M.A. and Ph.D. degrees.

THE INTERSTATE TEACHERS' AGENCY
302 Balter Bldg., New Orleans, La.

"Study in the Nation's Capital"

The George Washington University
(Founded in 1821)

Summer Sessions, 1929

Courses in

Education, Liberal Arts, Fine Arts, Library Sciences, Engineering, and Government.

6 weeks term—July 1–August 10
9 weeks term—June 17–August 17

Law

First term—June 17–July 31
Second term—August 1–September 14

For catalogues address,
The Registrar,
2033 G Street, Washington, D. C.

BUREAU FOR PROGRESSIVE SCHOOLS AND TEACHERS
Women's Educational and Industrial Union
264 Boylston Street, Boston, Mass.

This bureau suggests specially chosen teachers for placement in schools which are trying to improve upon traditional methods.

Kellogg's Teachers Agency recommends and has filled thousands of high-grade positions with excellent teachers. No charge to employers, none for registration. Enroll now! We have a constant demand for experienced teachers. Write for information to 31 Union Square, New York, N. Y.

TEACHERS WANTED
For Schools and Colleges
National Teachers Agency, Inc.
D. H. Cook, Gen. Mgr.,
Philadelphia, Penna.
Other Offices: Syracuse, N. Y.; Cincinnati, O.; Northampton, Mass.; Memphis, Tenn.; Pittsburgh, Pa.; New Haven, Conn.

ALLIED PROFESSIONAL BUREAUS
The Educators Exchange
A highly specialized and selective service directed to the important task of handling placements with effectiveness. We recommend superior availabilities to Boards of Regents, Universities, Colleges, Teachers' Colleges, and accredited Schools.
MARSHALL FIELD ANNEX BUILDING
Chicago, Illinois

McCLURE'S EDUCATIONAL BUREAU
Albuquerque, New Mex.
A teachers' agency which gives honest, efficient service and takes a personal interest
IN EACH TEACHER AND SCHOOL ENROLLED
School Furniture and Supplies
C. V. McCLURE, A.B., A.M., Sec.

PENN STATE *Announcing*
The Most Ambitious Program in the History of
THE INSTITUTE OF MUSIC EDUCATION
July 1 to August 9
SUMMER SESSION
Address the Director of Summer Session
State College, Pennsylvania
for Institute Bulletins and Comprehensive Catalogue
23 Prominent Instructors **40 Varied Courses**

SCHOOL AND SOCIETY

EDITED BY J. McKEEN CATTELL

WITH WHICH IS COMBINED THE

EDUCATIONAL REVIEW

EDITED BY WILLIAM McANDREW

Volume XXIX | SATURDAY, JUNE 15, 1929 | Number 755

THE PHILOSOPHY AND ORGANIZATION OF RESEARCH[1]

By Dr. B. R. BUCKINGHAM

HARVARD UNIVERSITY

I SHOULD like, at the outset, to pay tribute to the group of persons who chose the topic for this convocation. The progress of the world rests squarely upon research; and as the boundaries of knowledge are extended, through its instrumentality, along one sector after another of the frontiers of human thought, and as a larger and ever larger number of workers join its ranks, the social significance of research is destined, as I verily believe, to exceed that of any other service yet entertained by the mind of man. It provides for nothing less than a new analysis and a new synthesis of human behavior and human relationships.

It therefore seems to me that the topic for the convocation this year has been happily chosen, and I feel it a privilege to take part in a program so admirably conceived.

In order that our generation may cope with the infinite detail of human activity and thought, it is necessary to divide the total field into areas within which conditions are more or less alike, and to call each of these areas by a distinctive name. Thus arise the various knowledges—the crafts, the sciences and the humanities. We say that this topic is classifiable under physics, that the other is in the field of aeronautics, that still another belongs to the subject of geography, and so on. We know quite well that the boundaries between these subjects are vague and shifting. We know that a given topic may belong to geology or physics or chemistry according to the way we think about it. Nevertheless, these means of classification are useful as pegs on which to hang our thoughts, and perhaps as crutches to sustain our faltering steps.

Research is a method applicable to all these areas of thought. Observe that I refer to research as a method. It is not, as I view it, a field of knowledge, although it is entirely possible to study it for what it is, namely, a way of establishing new facts, principles and procedures. The boundaries of research are precisely those of human knowledge itself. A student, therefore, who wants to "major in research," has the universe as his field of concentration. There is no domain of human thought which research may not reach and extend; there is no skill which it may not investigate and improve; there is no ideal which it may not examine and enrich.

The purpose of this universal method, we are agreed, is the *contribution of new*

[1] Address delivered before the sixty-fourth convocation of the University of the State of New York, October 18, 1928.

truth; and I submit there is no endeavor more worthy of the best efforts of a human being. I have just used three important words in the vocabulary of research, namely, "contribution," "new" and "truth." Truth as a concept is common enough, yet it is one of the noblest to which man attains. The Almighty is Himself described as the God of truth. In that supreme ethical triad, "the good, the beautiful and the true," it is *truth* which furnishes the climax. The research worker is nothing if he does not seek the truth wherever it may be found and in whatever form he may encounter it. Indeed, love of truth is the only thing from which, as a research worker, he can not be separated without losing his character. He may lack any virtue but that one, and survive. It has been pointed out that each calling has its special form of disqualification—a sort of negative test of fitness. The judge must not accept a bribe, the lawyer must not take a retainer from both sides, the doctor must not refuse to heal the sick; even the jockey must not "pull" the race, nor the pugilist "throw" the fight. The research worker must not fail to proclaim the truth as he finds it. Truth he can not tamper with and retain the respect of his confrères.

Although truth is at once the object of research and the touchstone of competence on the part of the research worker, it is not just any truth which may properly serve the purposes of research. The ideal is *new* truth, and it is right here that some of the critics of research pour forth the vials of their wrath. "Research," says one of them derisively, "is trying to find for the hundredth time what everybody knows and then explaining it in language nobody understands." Truth already established as such is not a proper object of research. Even here, however, a caution is necessary. "What everybody knows" may need revision. A fiction agreed upon is still a fiction. Not long ago I fancy everybody "knew" that small classes were being better taught than large classes, and I suspect that people of the mind of the man who made this satiric definition would have deprecated the early investigations of Boyce and Bachman and Elliott, who sought to find out forsooth whether small classes were actually being taught better than classes of larger size. It turns out—as "everybody" certainly did not know—that the advantages which small classes ought to afford are not in reality being attained, and that, with present teachers operating under present conditions, classes of twenty are not better taught, according to any measuring scheme that we can apply, than classes of thirty or thirty-five. The critic who dubs research workers mere putterers trying to find out for the hundredth time what everybody knows may be passing a very superficial judgment.

Nevertheless, I think we all get the force of the criticism. A great deal of so-called research is trivial; a great deal of it is stamping over old ground; a great deal of it could be better employed.

Yet I should like to point out that there is a place for repeating investigations that have already been made, and that such repetition often deserves to be crowned research by anybody competent to bestow the title. This is because one investigation, even if well conducted, is seldom a sufficient basis for the establishment of new truth. The first findings probably need to be confirmed. Sometimes the second trial, instead of confirming the first, modifies it or even contradicts it. Then many more investigations of the same kind must be made before we can be sure what the truth is. Each of these repetitions of the original investigation—as long as there is honest doubt as to the nature of the result—deserves the name of research. It may not be as interesting as an investigation never before attempted.

it may not challenge the world; but we must remember that very few men indeed are capable of finding new problems. At a single memorable meeting in his Leipzig laboratory Wilhelm Wundt assigned thirty-eight new doctorate problems together with their key readings; but Wundt was almost unequaled as a frontier thinker. The criterion of newness as applicable to research is reasonably met as long as the study in question is not seeking to find out something which has in reality already been satisfactorily established.

Finally, returning to the definition in three words, I wish to point out that research has as its object the making of a *contribution*. If a research report were indeed written "in language nobody understands" there would obviously be no contribution. If the topic were so trivial as to be of no consequence whatever, there would again be no contribution. If the execution of the research were so faulty that its conclusions had no meaning, there would, from a third point of view, be no contribution. Evidently, therefore, the question of whether a contribution is made breaks up into several conditioning items. The problem must have some worth, the execution must be sufficiently competent to secure results of value and there must be a report which brings the findings to light in understandable form.

With this objective in mind, namely, the contribution of new truth, it is proper to consider the nature of research—in other words, its philosophy. For the philosophy of anything, I take it, is just that—its nature, its true meaning, its place in the scheme of things, its relation to life. Broadly speaking, research is a form of thinking. It can not arise until a problem is recognized. It can not proceed until data have been assembled. It requires the organization of these data so as to disclose their meaning and relationships. It ordinarily involves the setting up and frequently the tearing down of hypotheses or leads or "hunches." It organizes its data with reference to these hypotheses and pronounces them provisionally true or false, according to the meaning of the data when arrayed in accordance with these hypotheses. Finally, if the research worker is fortunate, a solution of the problem is attained, or in lieu of this an impasse is reached and recognized as such.

So far the procedure is scientific, and ordinarily this is as far as descriptions of research go. Yet the description is certainly incomplete. Suppose that a particular piece of research has advanced through the stages I have mentioned—stages which correspond to those of reflective thinking—and has arrived at a solution, provisional at least, of the initial problem. It is quite evident that something more is needed. Science has done its part, and philosophy must now take up the task. This no other than the interpretation of the scientific findings. This involves the determination of meanings and values. It raises the question, "What is this result worth?" In seeking to answer this question, philosophy, of course, views life as a whole and regards as of worth those things which serve the purposes of life. Moreover, philosophy attempts a higher synthesis than is available to science. Just as science uses observations—employing the term in its widest sense—for its data, so philosophy may use (among other things) the findings of science as *its* data. Accordingly there comes into view a hierarchy of activities ranging from the organizing of very simple observations, such as counting the legs of a beetle or the petals of a flower, to the organizing and evaluating of complex and far-reaching generalizations. I am not sure that any one can say at just what point science ceases and philosophy begins. I do know that philosophy goes deeper, although

its techniques are less objective and less convincing. The findings of philosophy, although they lack the precision of science, possess a range and significance which science alone can not give.

I therefore view the matter somewhat as follows. As fields of human endeavor science and philosophy supplement each other. Science furnishes data for the use of philosophy, while philosophy gives these data meaning. Without philosophy, science is incomplete; without science, philosophy is barren. Of course, it goes without saying that the scientist and the philosopher may be the same man. In fact, if a scientist has no philosophy, he is an unsafe guide, while the philosopher who is without science is a mere speculative dreamer.

Just as I hold that both science and philosophy are needed in research, so I hold, too, that the methods of research are themselves applicable in the fields of science and philosophy. In other words, I recognize both scientific research and philosophical research. In fact it seems to me that the only creative work available to the philosopher is precisely of a research character—an activity in which he uses data just as certainly as the scientist uses data, and for the same purpose—namely, the establishment of truth.

I have said in an earlier paragraph that research provides a new analysis and a new synthesis of human behavior and human relationships. In making this statement I have in mind the fact that the research worker, whether in education or elsewhere, must select *specific* problems, and that in order to do this he must analyze the field. With further regard to analysis, it is my notion that if many workers devote themselves to a given field, each after he has thus selected specific problems, it is possible to approximate a condition whereby all attainable major problems within the field are identified, thus providing a sort of "spot" analysis of the field in question. This result would follow in education if the burning need for quantity production in research were generally realized and if large numbers of workers were organized to meet the need. My point is that to the extent that this is accomplished we shall have an analysis for purposes of research of the entire field of education.

But analysis is never sufficient. As long as the elements into which a whole may be broken up are all that we have at hand, our data are unorganized, refractory and difficult to control. Moreover, they may not even be true. At this point the philosopher plays his part. As each new problem reaches solution—or as each contribution of new truth is made—knowledge as it has hitherto existed must be modified. The newcomer has to be properly placed in the company which he has entered. Thus new alignments are made and new groupings, with new meanings for each of the alignments and groups. You have seen this process of integration going on in education with astonishing rapidity during the past twenty years. If the story were mine to tell at this moment, I could show not only that the accomplishment of the schools is quite different from what it used to be but even that our conception of method and our appraisal of results are distinctly new. What we are pleased to call progress—and I think we are justified in calling it progress—has been more rapid within the past twenty years than ever before. This is due to the research movement in education and to no other cause whatever. Research and research alone has made the scientific analysis and the philosophical synthesis which is the thing we call progress. For, after all, what is progress? Is it not truth ascertained and made meaningful? Is it not, in other words, science and philosophy operating through research methods?

In what I have thus far said I refer to research at its best. I mean research well organized and competently conducted; which is no more than to say, research of the kind that contributes new truth. It now becomes necessary, in the interest of presenting a whole thought, to examine the conditions under which research may be said to be "well organized and competently conducted," in other words the conditions under which it may merit what I have claimed for it.

About us on every hand are problems. The apprehension of these problems is the first necessary step in research. Let us suppose that a new consolidated school has been erected in a certain rural township. Apparently all the machinery of a modern school has been established and the children have been enrolled. It develops, however, that these children attend very irregularly. The work of the school is impaired. Something is evidently wrong. This is a problem and one of a very practical nature. Its solution may be attempted by speculation or by the use of authority. But the best way is by means of research. Probably the research worker will begin by studying the conditions in this school which are different from those in schools where the attendance is satisfactory, for he will think it probable that the cause of the poor attendance will be among these conditions. He may note that the distance between the pupils' homes and the school is greater in this instance than it is in schools otherwise similarly conditioned but having good attendance. The research worker may now formulate a hypothesis, at least in crude form, such as "the greater the distance from school the poorer the attendance."

A great many people stop right here. Moreover, some of them call their work research and their hypothesis the product of research. This is especially true if they have reached their conclusions by the use of elaborate questionnaires. This is what gives the critic a chance to say "Why, everybody knows that."

Dr. George H. Reavis in his study of attendance in rural schools reached this hypothesis; but he did not stop there. He went on and verified his hypothesis, defining and qualifying it as he proceeded. He showed among other things just what effect different distances from school had upon attendance—that, for example, there were three rather distinct zones of distance within each of which attendance was about the same, namely, distances up to a quarter of a mile, those from a quarter of a mile to a mile and a half, and those of more than a mile and a half. Again, in verifying and modifying his hypothesis he brought out in similar detail the bearing which the age of children has upon their attendance, when they come from homes of given distances from the schoolhouse.

By this time Dr. Reavis had shown that the causal relationship between distance and attendance which he had set up as a rough hypothesis was by no means simple. He had proved that the law embodying the solution was not at all the direct proportion which was formulated in the hypothesis and he had established the true solution in its multiple form with substantial reliability. The only step he left out was that of verification—the stage in which the solution is tried out, for further criticism and refinement. As he proceeded in his study, however, he came upon certain new problems such as the effect of different kinds of roads, of the presence or absence of a system of transportation, of different types of transportation, and of climatic and seasonal conditions. Since he could not make a systematic attack upon these problems with the data at his disposal he contented himself with suggesting the problems for future consideration.

I have used Dr. Reavis's study merely as a type. Any one of a large number of competent research reports would have done as

well. I have used his report to show that in research we have first the realization of a problem and second the formulation of a crude hypothesis. This latter is often made after considerable preliminary study and is sometimes wrongly taken as the solution of the problem. The third step is the investigation itself designed to verify the hypothesis and at the same time to amplify it and subject it to critical examination. During the course of this investigation new problems usually emerge and these problems are stated. All along the way you will notice that these are the processes which Dewey has made familiar to us as the steps in thinking. In fact, as has already been suggested, it is not improper to regard research as a type of reflective thinking.

The essential difference between thinking which is not research and thinking which is research is in refinement of method—a refinement the purpose of which is to assure the truth of the result. Most of these refinements have to do with the nature of the data. First, they must be *relevant;* if we are concerned with twelve-year-olds, we must exercise due care to keep out returns from children of any other age. Second, the data must be *representative;* we must either secure all the twelve-year-olds or an unbiased sampling of them. Third, the data must be *abundant;* we must have enough cases of twelve-year-olds so that the addition of more cases will not materially alter the result. And fourth, the data must be *trustworthy;* if we are securing the record of the twelve-year-olds in reading we must use a measuring instrument which is valid, reliable, objective and accurate.

Probably the thinking ability of man has not improved within historical times. Certainly we have no right to suppose that we of to-day can think any better than our ancestors. Yet we do get more and better results. The improvement is not in the power to think but mainly in getting our data and safeguarding them from error. For example, there was a time when a citation from an authority—preferably the Bible or Aristotle—was admitted as an entirely sufficient datum, at once relevant, representative, abundant (because self-sufficient) and trustworthy beyond cavil. Speculation provided data especially acceptable in learned circles. The sterile philosophy of the middle ages and of the modern period almost to our own time was sterile because it cared little about its data and was concerned mainly in the quality of its speculative procedure. If we can ever enlist the amazing acumen of the philosopher in the consideration of the right kind of data we shall experience another renaissance.

Still other and even more questionable sources of data have been accepted in the past and are still accepted in some quarters as a basis for thinking. Custom or tradition, maxims or wise saws, folk-tales, dreams, fortune-telling, spiritualistic séances, political platforms, advertisements, campaign promises—in short any plausible hocus-pocus, especially if it emanates from a high place or is put into print or is dressed in attractive literary form—are accepted and actually used as the data of thought. It is no wonder that the culture even of the most enlightened nations has been honeycombed with taboos and superstitions. It is not, however, the thinking considered as a pure process of handling data that has been at fault. It is the data themselves. Our lamentable failure through the ages to make the best use of our power to think has been our failure to criticize the materials upon which the forms of thought were exercised. Thinking can rise no higher than its source; and if the data upon which it rests are vitiated the entire fabric is unsubstantial.

Thus it is the requirement of adequate data which, more than any other one thing,

distinguishes the modern activity called research from the less fruitful thinking of an earlier and less scientifically critical day.

But if the adequacy of the data is of paramount importance, it is also regarded as essential to a research technique that the data should be handled so as to bring out their true meaning. Here statistics plays a prominent part. In fact Professor Simonds goes so far as to say that "all research involves the use of statistical methods." This does not seem to me to be true unless we give statistics a wider meaning than usual—a meaning so wide for example as to make it a part of all reflective thinking. Historical research investigates among other things the credibility of records. In doing so it can hardly be said to "involve the use of statistical methods." Nevertheless, the very fact that such a claim could be made indicates that the prevailing method of handling research data is statistical. It is certain that no research worker in education can proceed far without resort to this new science of numbers.

Statistics in reality represents a new type of logic. Professor George Boaz recently pointed out that according to the mode of thinking from Aristotle to Huxley everything belonged to an appropriate class. The camel, the bear and the humming-bird each had its fixed characteristics. A novel had certain features which made it a novel, a dollar was a dollar even if it would purchase but a third as much as formerly. Soldiers were invariably brave and women were always fair. The world was nicely marked off into types.

Our thinking, as Professor Boaz further points out, now comes more and more to center around the statistical class. We recognize that bravery is an attribute which may vary all the way from foolish, rash, romantic temerity to the timidity of those who "scenting the acrid perfume of the artillery, scuttled off to Washington and got jobs in the Judge Advocate General's Department." We realize that all women are fair only in theory and that if we were to arrange them in the order of fairness we should have at one end the face that launched a thousand ships and at the other the face that would stop a clock. Accordingly Professor Boaz says that thinking to-day is different from what it used to be. This, he believes, is not so much because we think of different things as it is because we think differently about the same things. Our very logic, he says, is different from that of our grandfathers.

We recognize therefore the presence of a new and powerful instrument to assist us in the organization of large masses of data. One of the stumbling-blocks in pursuing research of certain types has been the necessity of securing thousands of cases. On the one hand, without this abundance of data our results were unreliable; while on the other hand their mere bulk proved an unsurmountable obstacle. The new methods of handling numerical data have gone a long way toward making possible the authoritative conclusions which a wealth of raw material can alone ensure. In short, if it were not for the development of statistics, much of modern research would be impossible.

Sometimes, however, the very attractiveness of statistical technique leads to our undoing. Under the influence of statistical method our procedure tends to lose flexibility and to harden into set forms. When we decide to use measurement and the analysis that measurement permits, we put our trust in precision, accuracy and definition. This is desirable up to a certain point, and in some kinds of work it is desirable all the way. But there are wide areas of thought where precision is not possible or where it can only be attained by non-statistical methods. To let statistics aid our thinking

is imperative as far as statistics applies, but to let it dominate all our thinking is to court disaster. Indeed there is in some quarters a lamentable tendency to substitute statistics for creative thought.

I believe this is true in some of our curriculum research. Let the work in spelling stand as a type. Here as in other subjects much labor has been expended in finding out the words most frequently used in written discourse. This is admirable so far as it goes. But quite clearly it does not suffice.

In the first place, we can not by any means be sure that the present determination of frequency of use is the true one. For example, in a list which purports to consist of the thousand commonest words, we do not find the names of our daily meals —neither *breakfast* nor *lunch, dinner* nor *supper*. Nor do we find the commonest articles of tableware, such as *plate, cup, knife, fork* and *spoon*. Many articles of food— *potatoes, beans, beets, peas, meat, fish, bread* and *butter*—are not named; nor are some of the commonest articles of clothing nor some of the most familiar colors. Only the *horse* is mentioned among domestic animals. The dog and the cat, the cow and the sheep find no place in the list.

One may contend that these may indeed be common words without being frequently used in written discourse. The contention, however, has little plausibility. A child can not write of his play without using such words as *hide, jump, swim, fish* or *sled*, and these words are omitted from the thousand said to be most frequently used. He can scarcely write of the barnyard without requiring such omitted words as *hen* and *egg;* he can not write about his *garden* nor the *baby* at home; nor about the *moon*, the *sun*, the *sky* nor the *stars*. Yet these are the things within his experience. They are, therefore, the sort of topics which we should expect him to write about.

On the other hand, among the "thousand commonest words" we actually find these: *preliminary, recommend, impossible, assure, committee, investigate, national;* and a number of terms of apparently legal meaning such as *property, judgment, testimony, complaint, agreement, witness* and *conviction*. This suggests that the source of our vocabulary studies must be very greatly widened and that an enormously greater amount of written material must be examined.

In the second place, even if true frequency of use has been determined, we assert that there are other tests of value than frequency of use. For example, although the word *bread* may be rightly excluded from the thousand commonest words, yet circumstances which, while they may be relatively infrequent are nevertheless inevitable, will make it at times indispensable in one's written vocabulary. Future research may conceivably confirm the present determination that *apple* and *banana, bright* and *beautiful, meat* and *drink* likewise do not belong to the thousand commonest words. But this is not a sufficient reason why they should be banished from our spelling curriculum. These are simple words and they stand for ideas common to the race. The ideas may not require expression quite often enough to secure for the words a place among those used with an assigned frequency; but when these ideas do require expression—and no one can escape the necessity for such expression—they become as "socially useful" as do their more frequently used competitors.

In the third place, in selecting material for the school curriculum, difficulty as well as frequency of use is a criterion. Indeed to a certain extent there is an inverse relationship between difficulty and frequency of use. Some elements of school subjects, precisely because they are frequently used and hence often repeated, do not need to be

taught at all. Such is the case, for example, with most of the two and three letter words in our language. For example, no one who is in the least degree literate misspells *and* except by inadvertency—and correcting inadvertency is not a spelling problem. Some of the recent spellers in their attempts to adhere to the vocabulary studies have included a considerable group of words which do not constitute a spelling problem.

In the fourth place, whether with reference to spelling or any other subject of the curriculum, whatever the much-discussed aim of education may be it contemplates something more than the round of common experiences, something richer than the elemental facts of life. Moreover, it is only by providing for more than is now generally available that progress is possible. Here as elsewhere in the application of scientific procedure to education, a sound philosophy—as well as a sound common sense—must be invoked to save the scientific procedure from itself.

Four points may, therefore, be made with reference to the sufficiency of the idea of frequency of use. The first is that material far greater in amount and variety will have to be examined before we can be sure that frequency of use has been determined. The second is that certain material of relatively low frequency of occurrence has a social usefulness which renders it indispensable. The third is that difficulty, or need of being taught, is an important criterion—one which operates in particular to reject from the formal curriculum an appreciable amount of frequently used material. The fourth is that if we include in our curriculum only the materials which are found to be frequently used by children and adults we leave altogether out of account the material which they ought to use and would use if their lives were fuller and richer. This fulness and richness, we feel quite sure, the school must envisage. Moreover, to adjust the curriculum merely to current usage is to doom our educational system to a static condition wherein progress becomes impossible.

I have given this lengthy illustration because I wish to take a stand in the name of the integrity of the research movement for the use of interpretative thought, ranging from common sense to philosophy, to supplement the results of quantitative measurement. Never at any time shall we reach the point where the measurements will do all the work. If the perfectionists —be they purists within the ranks of the testers or obstructionists outside of them— demand this, they demand too much. Educational measurements will not automatically and unerringly sift children into compartments, and for my part I hope they never will. There will never be a time when our measurement processes will be so extensive that good judgment will not play a proper part after the results have been secured. Not infrequently the real function of measurement and statistics is to reduce the problem to dimensions such that reasonably good judgment can carry it to a solution.

But even if the test measures are fallible, this does not justify us in throwing up our hands in despair or lifting our voices in derision. Are we not better off than before? Is not the probability of being right greater than it has ever been? Why should any one prefer to think any less accurately than he has to about anything that can be the subject of thought?

As we become more and more capable of measuring our methods and results, we give closer attention to the discrepancies between our measurements. This does not mean that the discrepancies are really larger, but rather that the measurements have permitted us to detect them. Things which we never thought of before make themselves manifest. One reason why mistakes in the classification of pupils look so

big is precisely because objective measurement serves to show up our blunders. Before we had measurements our failures in this respect were ghastly. But we were blind to them. Therefore we thought they did not exist.

Let 's be sensible. Let us demand of the measurers that their system shall be clearly better than the one it seeks to supplant. Let us also call them to account when they are over-pretentious. But let us not demand of them a system which shall work with machine-like accuracy, for in so doing we shall not only ask the impossible, but also stand accused of seeking a desideratum of dubious value.

The position I have just taken has obvious practical meaning. It has close bearing upon the organization of research work which a superintendent may set up in his school system. Since research, to my way of thinking, is not throughout its entire course dependent upon measurement and statistics, there is a place among research workers for those who have not perfected their training in these matters. The common sense of the experienced teacher is not to be despised in assigning research work on a cooperative plan.

It is my belief that every educational institution from the kindergarten to the graduate school should be organized both for research and for teaching. We readily enough recognize that the university professor should contribute to the sum of knowledge within his field. The same expectation, however, should be entertained in the case of the secondary-school teacher, the elementary-school teacher and the various supervisors and administrators. They may indeed be expected to do less research in proportion to their other service than do university professors, but this is a difference in degree rather than in kind. Investigation *as well as* instruction, research *as well as* teaching, should be expected, planned for and paid for.

Indeed, teachers themselves should welcome this principle. Winch has well said, "Without the cooperation of teachers there will never be in any appreciable sense a science of education. If teachers stand aside and do not help, they will only have themselves to thank if methods are imposed upon them from the results of experiments which they do not understand, which are not really applicable to their work and in which they have no share."

In the movement to democratize education let us reflect how unwise it is to jam our nostrums down the throats of teachers, and how advantageous it is to give them that vital part in determining policies and procedures which research permits. We may honestly believe that a certain method is the best or at least better than a rival method now in operation. This we may call our hypothesis in a research project. What better way is there to enlist the interest of teachers than to have them try out the proposed method?

Suppose, for example, we wish our teachers to abandon the formal teaching of phonics and to resort to a "look and say" method of teaching reading. One way, of course, is to foist a "look and say" method upon the teachers by adopting a text-book committed to this method and requiring the text-book to be used. A far better plan would be to treat the teachers as intelligent participants in the educational enterprise and show them how to try out these rival methods of teaching reading. It may very likely become evident that our hypothesis is not valid, in other words that our particular method is not after all the better method. In that event we should clearly have been mistaken in requiring it.

We believe in creative work for children. We should have the same belief in regard to teachers. Research provides the opportunity. It is impersonal, unbiased and wholly genuine. It has no apologies to offer and no argument to make for its existence. It exists and grows among us on the basis of sheer worth and undisputed accomplishment.

RESEARCH IN CHILD DEVELOPMENT[1]

By ARNOLD GESELL, M.D.

DIRECTOR, YALE PSYCHO-CLINIC, YALE UNIVERSITY

POPE'S dictum that "the proper study of mankind is man" has in America been revised to read "the proper study of mankind is the child." Never before in the history of education has a people so deliberately and on such a large scale undertaken to investigate the nature and the potentialities of the child. With the partial exception of Russia, America leads in volume and in organization of child research. But the basic network of this research is international and is the product of modern science, which is quite irrespective of national boundaries and of national impulse. Fundamental research is in the last analysis the expression of individual scientists, and peculiar to no country.

In America, however, the study of the child has distinctive features which have been powerfully influenced by social forces. The material conquests of industry and of invention have made new social issues. There is a vague consciousness that the arrangements of society are altering under the pressure of economic and industrial changes so that even the old-time concepts of family and of school must modify in some measure with the newer form of civilization. It is highly significant that the great social movement of adult education in America finds itself closely linked with the whole problem of preschool education and with the development of child research. Even in the child study movement of the elegant eighties and the gay nineties it was so. It is this intermixture of popular and scientific expressions which will make the late Victorian child study movement, with all its shortcomings, significant to the historian.

The National Research Council in 1923 gave a certain official recognition to the scientific status of child research by the organization of a committee on child development to foster and coordinate such research. More recently, under similar auspices there was held a conference to outline the field of study represented by problems of family organization and of family life. Increasingly, the problems of child research are being approached from the standpoint of social organization and of the family institution. These problems are so interwoven that they can not be solved by the sciences of child psychology or of educational psychology in the traditional sense.

Child development is a useful, even though protean term. The problems of child development involve such varied scientific fields as biochemistry, developmental anatomy, nutrition, anthropometry, anthropology, psychiatry, pediatrics and genetic, experimental, comparative and clinical psychology. Child development is fundamentally a branch of human biology—a focal field for psychobiological and medical knowledge converging upon the central problem of early human growth. This is, of course, a prodigiously inclusive field of inquiry, but it is a legitimate one because the phenomena of growth are subject to general and unifying laws which can be formulated only by coordinated contribution from several scientific domains. Growth is itself a unifying concept which removes undue distinctions between mind and body, between heredity and environment, between health and disease and, we may add also, between separate scientific disciplines. In spite of their diversity and intricacy the problems of child development are organized and even simplified by the integrating concept of growth—a concept which will increasingly supplement and displace the concepts of education and of hygiene.

It seems important to emphasize the status of child development research as a branch of human biology. The study of the infant and the preschool child is not merely an extension downward of the prevailing concepts of mental testing, of psychometries and of educational measurements with all their schoolroom implications of homogeneous grouping, classification according to abilities, promotion on the basis of achievement scores, etc. The orientations of research in child development are medical and

[1] Abstract of address at a meeting of the National Society for the Study of Education, Cleveland, February 26, 1929.

biological. They should remain so. The problems of early child development can not be envisaged in the conventional terms of learning, of school attendance and school organization. It is possible that even the nursery school, as a research device, has already made too much compromise with the traditional forms of elementary education.

It seems that the twenty-eighth yearbook of the National Society for the Study of Education[2] has taken a constructive and judicious attitude with reference to the educational status of the preschool child. It gives full recognition to the position of the public school, both from the standpoint of the kindergarten and of adolescent provision for preparental education. It recognizes, however, that the total welfare of the preschool child must take into account the field of infant hygiene represented in the home and in the consultation center.

A major division of the yearbook is devoted to critical and summary discussions of research activities in the field of child development. Over one hundred studies are abstracted in convenient form under the following headings: (1) Physical Growth. (2) Motor Development. (3) Language Development. (4) Intellectual Development. (5) Emotional and Social Development. Brief comments will be made on investigations in these five fields.

It is proper that the yearbook should contain a section on research studies in the field of physical growth. Although these studies have no immediate pertinence to the educator, they show how the basic physical welfare of the child rests upon a vast structure of research in animal and human biology. Indeed, discoveries which arise out of the field of physics and chemistry and of clinical medicine, as in the case of irradiated ergosterol, may be most significant for the developmental welfare of the preschool child. In this instance, a biochemical discovery points to the speedy extinction of the most prevalent handicap of early childhood, namely, rickets.

Studies in motor development thus far have been concerned chiefly with early infancy. These studies are important with regard to practical problems of posture and of motor skills which will fall increasingly within the purview of social control. In due time the foundational training of technical skills (possibly air-mindedness in the field of aviation!) will be anticipated in preschool measures which can only be defined by apparently remote researches in the fields of neurology and psychomotor development.

Studies in the field of language development seem to lie nearer to academic education, but even here genetic studies are necessary to establish the important fact that the language of early childhood, in spite of superficial resemblance, is psychologically not equivalent to the language of later years. The child has his own peculiar logic. Apparently he soliloquizes even when he talks to others. These researches into child logic are very important for the just appreciation of the preschool age. The yearbook reports an interesting study in the results of training a group of children in speaking French, a study which suggests that certain portions of the problem of modern language abilities may well be shifted to the preschool level, and even solved there with practicable rearrangements in the field of linguistic instruction. Speech, normal and defective, vernacular and foreign, is peculiarly a preschool problem, demanding continued research.

The section on intellectual development contains discussions of mental age and of intelligence quotient with reference to the preschool child. The studies, as a whole, show a drift away from the simpler psychometric concepts toward a descriptive, analytical interpretation of individual children, which aims to define their special talents and their patterns of ability and potency rather than degrees of a general capacity.

The section on studies of emotion and personality likewise shows a healthy trend toward a clinical individualization of child problems. Sufficiently fundamental emphasis has been placed upon intellectual gifts. It is now important to shift the emphasis to personality gifts. The nursery school has here perhaps its greatest opportunity to make a contribution which will radically influence procedures in the elementary grades.

[2] "Preschool and Parental Education." Prepared by the society's committee (Baldwin, Gesell, Hill, Thom, White, Woolley, Meek). Public School Publishing Company, Bloomington, 1929. x + 831 pp.

It is of course impossible to appraise the ultimate values of the researches reported in the yearbook. Some of the studies are relatively minor in importance and in quality. Some American child research is unfortunately a kind of imitative investigation which does not spring from genuine inquisitiveness. But, taken as a whole, the investigations show an encouraging tendency toward coordination of significant knowledge.

At present the research seems to be strongest in the psychological and psychobiological directions. It is weakest where, here in America, we might suppose it should be strongest, namely, in the field of social relations, including neighborhood and community organization. Even the nursery school is in danger of losing some of its full value as a research instrument if it fails to develop new social patterns of procedure. The organization of educational provisions for young children and their parents needs a fuller understanding of the social nature of the whole problem, which can only be defined by creating new social groupings and new experimental methods of approach. Here is a field for inventiveness which can not take its cue altogether from the present family, much less from the present day school. Inventiveness in this direction requires investigatory imagination in combination with great sanity of judgment. It is a challenging field for a non-academic type of child research, as essential to progress as strictly biological knowledge. In the long run, however, there can be no opposition between the study of child development from the standpoint of natural science and from the standpoint of social science.

The public school has a great responsibility in developing new administrative arrangements through research. It would be a sad waste of a natural resource if school administrators permitted the American kindergarten to congeal into a preprimary schoolroom in its organization, when it ought to be a free, adaptable instrument used frankly for experimental purposes to define new procedures in the field of preschool and parental education. The kindergarten is still on the frontier where pioneering is in order.

The amount of research in the field of child development is attaining stupendous proportions. It is almost impossible to follow the stream of investigation even by reading the bulletins, titles, abstracts and bibliographies. However, the magnitude of this research should not be dismaying. Though there is no superman, even in the National Society for the Study of Education, to integrate this knowledge, there are forces of social selection which bring the truth, and the best truth, to the surface. Science itself is shaped by laws of growth which apparently are similar to those which we are attempting to study in the child himself.

EDUCATIONAL EVENTS

PUBLIC PLAYING FIELDS IN HOLLAND

THE first Dutch National Congress to consider the provision of public playing fields, where necessary, was held in Amsterdam recently and is reported in *The Christian Science Monitor*. A resolution, put forward by the League of Amsterdam Playground Societies, was passed unanimously, stressing the necessity of spreading the movement throughout the whole of Holland. Also a committee was set up for the continuation of the work of the congress aiming at the forming of a National Playing Fields League.

The Dutch playground movement, which originated in Amsterdam, has shown a remarkable growth in the last quarter of a century. In 1902, Uilke J. Klaren, a man of the people and an inhabitant of one of the oldest quarters of the city, took the initiative in endeavoring to establish suitable playgrounds—play "gardens" as they are called in Holland—for the children.

And with a band of simple women and men of the people, Uilke Klaren founded the first playground society of parents in Amsterdam. The purpose was to provide occupation for the children in their leisure hours, through the medium of play and manual work, music and singing.

Now there are already more than thirty district societies in Amsterdam, and several more in other parts of the country. At present there

are twenty-five play-gardens and four so-called "sand playgrounds," for which the municipality pays a subsidy of more than 140,000 florins per year. The municipal authorities, according to the *Monitor*, are well aware of the fact that this work on behalf of youth is of the utmost educational importance.

Investigation has already made plain that at least another thirty play-gardens are needed, involving an estimated expense of about 1,500,000 florins (as the town's share). This amount can not be voted at once, so the further development of the work must be carried on gradually.

EDUCATION IN ONTARIO

ANNOUNCEMENT by the Premier of Ontario, G. Howard Ferguson, of his intention to reform the educational system of the province by means of legislation which he will introduce next session, was, according to *The Christian Science Monitor*, the high point of the Western Ontario Conservative Association convention. The premier's proposal is, in brief, to provide two years of high-school work in the public schools of the province, and one year of university course in the high schools. Back of the plan is the idea that such a system would enable young people in the rural districts to remain longer under the family roof and parental guidance than is now possible, and that it would also mean extensive saving in costs to rural people who send their children to high schools or universities.

The premier, who is also minister of education, set forth his ideal "to make possible for every child in the province, regardless of its location, equal educational opportunity." He believes that by extending the public-school course to provide for children up to 16 instead of 14 years, as at present, he will help to accomplish that purpose.

Since the lower school work now given in high schools would be given in public school under the new plan, the premier proposes to give the high schools new work, and to do that, he said, he would have high schools impart tuition for first-year university work. There are many failures now in first-year university work, he said, and the new plan would automatically do a lot of culling and sifting.

Concluding, Mr. Ferguson said that the new system would result in a great saving of money, since it costs the government $400 a year for each university student, and costs the parents from $800 to $1,000 more.

THE ROCKEFELLER FOUNDATIONS

A REVIEW of the activities of the Rockefeller Foundation in 1928, written by its president, Dr. George E. Vincent, will be issued in a few days. It summarizes the reorganization of the several boards which has already been reported. During 1928 a conference committee of four Rockefeller boards—the General Education Board, the Rockefeller Foundation, the Laura Spelman Rockefeller Memorial and the International Education Board—sought ways of bringing the work of these organizations into closer and more definitely cooperative relations. In the autumn the committee made a report embodying recommendations which were approved by all the groups, with the understanding that the new régime would go into effect at the beginning of 1929.

The essential features of the reorganization were these: (1) the merging of the Rockefeller Foundation and the Laura Spelman Rockefeller Memorial into a new corporation to be known as the Rockefeller Foundation, which should assume all the assets and liabilities of the two boards; (2) the extension of the scope of the new foundation's activities to include not only public health, but the advancement of knowledge in the medical sciences, in the natural sciences (taking over the foreign program of the International Education Board), in the social sciences (heretofore administered by the Memorial), and in the humanities; (3) the administration of the public health activities of the foundation through an international health division with a group of seven scientific directors; (4) the appointment of a director with necessary assistants for each of the fields—the natural sciences, the medical sciences, the social sciences and the humanities; (5) a clearly defined division of labor between the General Education Board and the foundation through frequent conferences of the officers; (6) the incorporation of a China Medical Board with independent self-perpetuating trustees to which the lands and buildings in Peking together with endowment funds and annual appropriations should be given.

From this reorganization two large and well-endowed Rockefeller boards emerge: the General Education Board with a Federal charter which limits expenditures to the United States, and the Rockefeller Foundation incorporated under the general laws of New York State. The book value of the combined resources of the new Rockefeller Foundation will be more than $203,000,000 with outstanding obligations of $35,000,000.

Since their founding the four Rockefeller boards have not only distributed all their incomes but have appropriated $225,000,000 of capital funds. Even when the increase in market value of securities has been taken into account, the appropriations from principal represent a substantial reduction in the endowments of these boards.

THE DITSON BEQUEST TO MUSICAL EDUCATION

A TOTAL sum of $800,000 is to be devoted to musical education in this country under the terms of the will of Charles H. Ditson, music publisher, of New York City. The will gives $100,000 each to Harvard, Yale, Princeton, Columbia, the College of Music of Cincinnati, the New England Conservatory of Music in Boston, the Chicago Musical College and the Ann Arbor School of Music of the University of Michigan.

The terms of bequest to each institution are similar except for the names of trust funds to be established with the money. The Harvard bequest, typical of the others, directs that the $100,000 be used as follows:

> In establishing a fund the income of which shall be used for any one or more of the purposes herein mentioned as shall be in the judgment of the officers of the said college of the greatest benefit musically to said college, to wit: in establishing and maintaining a chair or chairs of music or musical history or musical esthetics, or in establishing and maintaining scholarships or fellowships in music, or in giving public performances of the musical compositions of talented students and graduates of said college, and if preferred of other musical composers.
>
> Such fund is to be known as the James Edward Ditson Endowment, and any chair or scholarship or fellowship which is established, to bear his name; but nothing herein shall prevent said president and fellows of Harvard College from investing the money as part of their general fund and applying a proportionate part of the income of their general fund to the purpose of this bequest.

James Edward Ditson was a brother of the late music publisher. The Yale, Columbia and Princeton funds are to be known as the Charles H. Ditson Endowments, while the funds of New England Conservatory of Music, the Chicago Musical College and the College of Music of Cincinnati and the Ann Arbor School of Music are to be known as the Oliver Ditson Endowments, in memory of Mr. Ditson's father.

THE NURSERY SCHOOL OF WESTERN RESERVE UNIVERSITY

THE school of education of Western Reserve University will open in September a model nursery school of twenty-five children aged from twenty months to three and a half years, with the recommendation that children be enrolled at birth to ensure study by the staff of the school. Miss May Hill, associate professor of education and educational director, has been appointed director.

The school will represent cooperative efforts of the school of education, the school of nursing and the department of household administration of the college for women, the graduate school, the school of medicine of Western Reserve University and the Brush Foundation. The last-named organization will find in the school an observation laboratory station for its inquiry into and definition of the well-begotten child.

The staff of the school, which will work in cooperation with an advisory board, will include in addition to Miss Hill: Miss Amy Hostler, teacher in charge; Miss Dorothy Eisele, of the department of household administration, assistant teacher and dietician; Miss Helen Coe Clowes, psychologist; Miss Clara Robinson, director of parental education. The consultant staff will include: Charles W. Hunt, dean of the School of Education; Dr. T. Wingate Todd, director of research of the Brush Foundation; Miss Mary Eliza Parker, professor of household administration in the College for Women; Miss Nellie X. Hawkinson, dean of the school of nursing; Dr. Dewey Anderson, research psychologist of the Brush Foundation, and Dr. H.

J. Gerstenberger, professor of pediatrics in the school of medicine.

The three chief objects of the school are (1) To furnish an environment that will foster the all-round development of the child from two to four years old, (2) parental education, (3) the gradual accumulation and analysis of records of child behavior and child development, especially in those phases of child life about which we now have little objective evidence. These studies carried on under the Brush Foundation and the department of pediatrics of the school of medicine will record the child's progress in physical and mental development by means of measurements, radiographic determination of growth, estimation of muscular power, lung power, proper elimination, records of behavior and analysis of the developing mind.

GUGGENHEIM EXCHANGE FELLOWSHIPS BETWEEN THE UNITED STATES AND LATIN-AMERICA

A GIFT of $1,000,000 by former Senator and Mrs. Simon Guggenheim to the John Simon Guggenheim Memorial Foundation, to establish a system of exchange fellowships between the United States and the Latin-American countries, has been announced.

The gift is made through the Guggenheim Foundation set up in 1925 to provide fellowships between this and foreign countries. The foundation has a capital fund of $3,500,000 exclusive of the new gift. The existing fellowships are available for Latin-American as well as other foreign countries, but it was felt that the potential value of closer intellectual relations with the nations to the south made it advisable to create a separate department for them.

In offering the gift Mr. Guggenheim wrote:

> My brothers and I have long been engaged in commerce with many of the republics to the south of the United States, and we know that there are no longer any important factors of economic isolation separating us. But a similar commerce of things of the mind, of spiritual values, is yet to be accomplished. It is Mrs. Guggenheim's and my hope that this new fund may assist in supplying that great need.

Since the establishment of the foundation, 230 fellowships have been granted, and important work has been accomplished by the fellows, including the writing of the poem, "John Brown's Body," by Stephen Vincent Benet, and the work in physics by Professor A. H. Compton, of the University of Chicago, for which he received the Nobel prize in 1928.

The new fellowships will first be granted in Mexico in 1930, according to present plans. Thereafter they will be extended to the other countries where arrangements for the system have been made. Latin-American countries where such arrangements have not as yet been made will also be brought into the system as soon as its success appears assured.

The plan to be developed, as outlined by the trustees of the foundation, is as follows:

> The Latin-American Exchange Fellowships, in the first instance, shall be open to citizens of the United States and of the Argentine Republic, Bolivia, Brazil, Chile, Mexico, Peru and Uruguay, on terms generally similar to those hitherto governing the John Simon Guggenheim Memorial Fellowships in the United States. The new fellowships will be granted for independent research and also for training in the various professions, including engineering and teaching. Special consideration will be given to applicants who desire to study political, social or scientific problems which are common to the countries of North and South America. If the above outlined Latin-American Exchange Fellowships are successful, the trustees will consider extending them to the other countries of Latin-America as rapidly as proper arrangements can be made.
>
> The stipend for these fellowships, either for Latin-America or for the United States, will normally be $2,500 for twelve months plus a travel allowance proportionate to the distance which the fellows have to travel to the places of their study. The fellowships will be awarded in the first instance for one year, but with the possibility of renewal.

AMERICAN HOME ECONOMICS ASSOCIATION

THE twenty-second annual meeting of the American Home Economics Association will be held at the Hotel Statler, Boston, Massachusetts, from July 1 to 5.

The first session will be a public meeting on Monday evening, July 1, held jointly with the Fourth National Conference of Supervisors and Teachers of Home Economics called by the United States Commissioner of Education for

that day. Dean Margaret Justin, of Kansas State Agricultural College, president of the association, will speak on "Twenty Years of Progress in Home Economics," and Dean John W. Withers, of New York University, on "What Is Progress in Education?"

At a second public meeting on Tuesday evening, July 2, the general topic will be "The Consumer and the Market"; the "Problems of the Homemaker as a Buyer" will be described by Dr. Faith Williams, and the point of view of the distributor will be expressed by Channing E. Sweitzer, managing director of the National Retail Dry Goods Association.

Special group meetings will provide for the interests of the various divisions of the association, such as those dealing with food and nutrition, clothing and textiles, household management and equipment, institution economics, child development and parental education, and the teaching of home economics in schools, colleges and extension services.

There will also be the usual business sessions of the association and its council, the latter open to all registrants.

Since the association is this year celebrating its twentieth anniversary, the program at the banquet on Thursday evening is planned to carry the members back to the days of its infancy and especially to its Boston friends who, under the leadership of Ellen H. Richards, of the Massachusetts Institute of Technology, played so important a part in launching this movement to improve conditions of every-day living by "the application of science to the problems of the home, the institution and the community."

TROUBLES AT CLARKSON COLLEGE OF TECHNOLOGY

AN Associated Press despatch under date of June 6 says that dismissal of two members of the faculty of Clarkson College of Technology "for insubordination," together with the resignation of a third professor in protest against the ousting of the two others, became known, following a mass meeting of students on June 5 to frame a formal protest to the board of trustees.

The dismissed faculty members are Professor Lynn L. Merrill, who has been at Clarkson nine years, and Professor George B. Lobdell, who has been there thirteen years. Professor Croskerry, with six years' service, resigned because of what he considered unfair treatment of his colleagues, and Mrs. Flora Laidler, secretary to President Joseph Eugene Rowe, resigned for the same reason.

Professor Merrill and Professor Lobdell were dismissed on the recommendation of Dr. Rowe, who went to Clarkson a year ago from William and Mary College, as a direct result, it is said, of a controversy over his abolition of student self-government. One of his first moves after taking office was to deprive students of all control—a step which was opposed by most of the faculty.

Specifically, the two dismissed faculty members were charged by Dr. Rowe with inciting opposition against him. They were reported to have been in New York attending a meeting of alumni called to consider the question of student government and to have expressed views contrary to Dr. Rowe's policies.

Dr. Rowe called the board of trustees together unexpectedly and the two professors were notified immediately after the meeting that "their resignations" had been accepted. Dismissal of the professors is reported to have aroused the student body to indignation, aimed especially at Dr. Rowe, and a meeting on the campus was attended by most of the undergraduates. A protest, to be sent to the board of trustees, was drafted and it was decided to await action by that body before taking other steps.

RETIREMENT OF MEMBERS OF THE FACULTIES OF THE UNIVERSITY OF CHICAGO

FIVE well-known members of the faculties of the University of Chicago, Professors Clyde W. Votaw, George W. Myers, Herbert L. Willett, Charles J. Chamberlain and Andrew C. McLaughlin, will retire at the close of the current academic year, each with the title of professor emeritus. The group has served the university for an average period of over thirty years.

Professors Votaw and Willett have served on the faculty of the Divinity School, the former as authority on the literature and interpretation

of the New Testament and the latter on Semitic languages and literatures. A member of the first university faculty in 1892, Dr. Votaw has been associate editor of the *Journal of Religion* and has contributed four critical volumes on early Christian literature. Dr. Willett went to the University in 1894, and has been dean of the Disciples Divinity House, president of the Chicago Church Federation and associate editor of the *Christian Century*. He has written ten published works.

Professor A. C. McLaughlin went to the University of Chicago as a teacher of American history from the University of Michigan in 1906. He has been director of the Bureau of Historical Research of the Carnegie Foundation, managing editor of the *American Historical Review* and is a fellow of the Royal Historical Society of England. Seven books are credited to him, the most recent his *Steps in the Development of American Democracy*.

After serving at the University of Illinois as professor of astronomy and applied mathematics and director of the observatory, Professor George W. Myers went to the University of Chicago in 1901 as professor of the teaching of mathematics and astronomy in the school of education. He is the joint author of a series of text-books for grammar and high schools and editor and joint author of the Standard Mathematical Service.

Professor Charles J. Chamberlain joined the department of botany in 1897 as specialist in plant morphology and cytology. He is a leading authority on the cycad family, most primitive plant group still growing, and has ranged the world to gather the finest collection of cycads available. He is the author of "Methods in Plant Histology," of "The Morphology of Gymnosperms" and "The Morphology of Angiosperms," both with the late Dr. John M. Coulter, and of "The Living Cycads."

EDUCATIONAL NOTES AND NEWS

DR. JOSEPH S. AMES has been elected president of the Johns Hopkins University to succeed Dr. Frank J. Goodnow, who retires at the end of the academic year with the title of president emeritus. Dr. Goodnow will continue to lecture on municipal law at the university. Dr. Ames had filled the office of provost during the last three years. He first taught in the university in 1888, and before becoming provost had been professor of physics and director of the laboratory.

DR. HERMAN SCHNEIDER, dean of the college of engineering of the University of Cincinnati and acting president since the retirement of Dr. Frederick Charles Hicks, has been elected to the presidency.

DR. KATHARINE BLUNT, chemist and head of the department of home economics of the University of Chicago, has accepted the presidency of the Connecticut College for Women.

DR. EDWIN ANDERSON ALDERMAN completed a quarter century as president of the University of Virginia when the class of 1929 graduated on June 11. President Alderman was the guest of honor at the alumni luncheon and received as a gift a silver service and dining-room furniture of the early American period as an expression of the regard in which he is held by the alumni. Since Dr. Alderman became president the number of members of the faculty has risen from 48 to 290 and the student body has grown from 500 to more than 6,500.

A DINNER in honor of Dr. Aven Nelson, professor of botany and president emeritus of the University of Wyoming, was given on May 13 by his colleagues of the board of trustees, of the university faculty and of the administrative staff on the occasion of the completion of his seventieth year of life and forty-second in the service of the university.

A TESTIMONIAL dinner was recently tendered to Dr. James M. Kieran, newly elected president of Hunter College, New York City, by his fellow members of the New York Academy of Public Education. Many of his friends were there to voice their congratulations and good wishes, among them Dr. Frederick B. Robinson, president of the College of the City of New York; the Reverend William J. Duane, S.J.,

president of Fordham University, and the Reverend Brother Cornelius, president of Manhattan College. Superintendent of Schools William J. O'Shea told of Dr. Kieran's early teaching experiences in the city's public schools, and Dr. Harry P. Swift, president of the board of trustees, and Mrs. Maxwell H. Elliott, president of the Alumnae Association of Hunter College, voiced the esteem in which the new president is held by the Hunter authorities. President Olive M. Jones and Professor Albert Shiels, of Teachers College, were toastmasters.

DR. WILLIAM H. NICHOLS has been appointed acting chancellor of New York University, to serve during the absence of Chancellor Elmer Ellsworth Brown, who is ill.

THE Case School of Applied Science at its recent commencement conferred the degree of doctor of engineering on Dr. Charles S. Howe, who is retiring from the presidency after having served for twenty-seven years, and on Dr. William Elgin Wickenden, the newly elected president.

DEAN ROBERT MAYNARD HUTCHINS, of the Yale Law School and president-elect of the University of Chicago, delivered the commencement address at the ninety-fourth annual graduation exercises of Lafayette College and the honorary degree of doctor of laws was conferred on him.

DR. AUGUSTUS TROWBRIDGE, dean of Princeton University Graduate School, was the recipient of the degree of doctor of science at the recent commencement exercises of Columbia University.

THE University of Maine has conferred the doctorate of laws on the Reverend Everett Carleton Herrick, president of the Newton Theological Institution. Dr. Herrick was the commencement speaker.

THE degree of doctor of agriculture has been conferred by Rhode Island State College on Dr. Albert R. Mann, dean of the New York State College of Agriculture.

DR. CARL S. PATTON has been elected president of the Chicago Theological Seminary to succeed Dr. Ozora S. Davis, who recently resigned after a service of twenty years.

PROFESSOR ISABEL F. SMITH, of the department of geology at Smith College, has resigned to become dean of Scripps College, Claremont, California. She will be succeeded as dean of the class of 1932 by Professor Leona C. Gabel, of the history department.

DR. HAROLD R. PHALEN, professor of mathematics and instructor in physics at St. Stephen's College, Columbia University, has been appointed dean of the college.

DR. EDWARD POTTS CHEYNEY, professor of history at the University of Pennsylvania, has been appointed to the Henry Charles Lea professorship.

DR. HERBERT W. BRIGGS, associate professor of political science at Oberlin College, has been appointed assistant professor of government at Cornell University to succeed Professor Bruce Williams who returns to the University of Virginia.

THE Depew chair of oratory in the George Washington University, recently established through the gift of Mrs. Chauncey M. Depew, has been filled through the appointment of Hayes Yeager, acting head of the department of public speaking at the University of Illinois.

DR. P. P. CLAXTON has resigned as superintendent of schools at Tulsa, Oklahoma, and Merle Prunty, principal of the high school, has been elected to suceed him. Galen Jones, principal of the high school at Reading, Pennsylvania, has been elected director of the high schools.

HARRY B. FINE, for several years connected with the staff of the Princeton Preparatory School, has been selected to direct the school beginning with next autumn, succeeding his father, Dr. John Burchard Fine, who for forty years has been headmaster. Dr. Fine has been in poor health for several years. He will continue to serve in an advisory capacity, his son having the title of "acting headmaster."

HERBERT H. FRANKLIN, of Syracuse, president of the Franklin Automobile Company, has been elected a member of the board of trustees of Syracuse University.

PROFESSOR HENRY ELDRIDGE BOURNE has accepted the editorship of the *American Histor-*

ical Review and will go to Washington, D. C., with a year's leave of absence from Western Reserve University, where he has been professor of history since 1892 in the College for Women. A year ago, when Dr. J. F. Jameson, who for many years had been the editor of the *Review*, resigned to take charge of the manuscript division of the Library of Congress, Professor Dana C. Munro, of Princeton University, took the editorial chair with the understanding that he would occupy it for one year only.

DR. HENRY RAYMOND MUSSEY, who for more than seven years has been professor of economics at Wellesley College, will become managing editor of *The Nation* on June 17. The publication has not had a managing editor since last autumn. Dr. Mussey held the position in 1918 and 1919 and has continued his connection with it as a contributor.

THE American Association of Teachers Colleges has appointed a committee of five, which will formulate plans for presenting to Congress a request for funds to make a study of teacher training in the United States. Members of the committee are as follows: D. B. Waldo, president of the Western State Teachers College, Kalamazoo, Michigan, *chairman;* J. L. Alger, president of the Rhode Island College of Education, Providence, Rhode Island; Ned H. Dearborn, president of the State College for Teachers, Albany, New York; Frank W. Thomas, president of the State Teachers College, Fresno, California, and Dr. L. A. Pittenger, president of Ball State Teachers College, Muncie, Indiana.

DR. A. J. JONES, of the University of Pennsylvania, who has been acting chairman of the Commission on Secondary Schools, will be on the faculty of the school of education of the University of Washington for the summer term. The chairmanship of the commission will be resumed by Dr. E. D. Grizzell, who has been in England during 1928–29. He is returning to the University of Pennsylvania for the summer session. While in England, Dr. Grizzell has been organizing the study of English schools in connection with the comparative study of English and American secondary education which he and Dr. Jones are making. Dr. Grizzell has been made professor of secondary education at the University of Pennsylvania.

THE daily papers report that Dr. Arthur W. Calhoun, instructor of economics at Brookwood Labor College, whose expulsion is sought by faculty members because of "his communistic activities," has stated that he would not resign. Dr. Calhoun, denying that he had any affiliation with the Workers' (Communist) Party, said that the faculty members had asked the executive committee not to reinstate him because he had opposed the policy of the college, expressed recently in the formation of the conference of progressive labor action.

DR. NICHOLAS MURRAY BUTLER, president of Columbia University and of the Carnegie Endowment for International Peace, has sailed for Europe. He plans to confer with associates and representatives of the endowment in different countries, particularly with the members of the administrative committee for Europe, which has headquarters in Paris.

AFTER thirty-one years of service, Professor A. H. Espenshade, head of the department of English composition of the Pennsylvania State College, will take a year's leave of absence, effective at the end of the present college year, during which he will teach English composition at the University of Hawaii.

DR. WILLIAM M. DAVIDSON, superintendent of the Pittsburgh public schools, has been granted three months' leave of absence by the board of education, during which time he will travel in Europe, studying the school systems. He will leave Pittsburgh on July 1 and will return on September 30.

DR. W. F. BOOK, of Indiana University, will during the summer give two special courses in psychology in the University of Hawaii.

PROFESSOR J. K. HART, of the school of education of the University of Wisconsin, will speak at the Fifth International Conference of the New Education Fellowship, which will be held at Elsinore, Denmark, from August 8 to 21. His subjects will be "New Schools in Action," "Adult Schools" and "Social Conditions in Relation to School Reconstruction."

DR. FRANK P. GRAVES, New York State Commissioner of Education, gave the commencement address at the University of Buffalo on June 4.

DR. GORDON JENNINGS LAING, professor of Latin and dean of the graduate school of arts and literature of the University of Chicago, gave the Phi Beta Kappa address in connection with the commencement exercises of the University of Virginia.

PRESIDENT EDWARD C. ELLIOTT, of Purdue University, delivered the commencement address at Bradley Polytechnic Institute at Peoria, Illinois, June 14, and at the Rose Polytechnic Institute at Terre Haute, Indiana, on June 15. He delivered the commencement address at Kansas State Teachers College at Pittsburg, Kansas, on May 23 and two days later the address before the graduates of North Platte, Nebraska, High School, from which he was graduated thirty-eight years ago.

PRESIDENT-ELECT ROBERT M. HUTCHINS, dean of the Yale Law School, will give the address at the convocation of the University of Chicago. Acting-president Frederic Woodward will preside and confer the degrees.

RUSSELL GORDON SMITH, of the department of sociology in Columbia University, died, presumably by suicide, on June 7. Dr. Smith had been ill for some time.

FRED J. BOHLMANN, of Peekskill, New York, for fifteen years superintendent of schools, has died at the age of fifty-four years.

DEPAUW UNIVERSITY will receive the residue of an estate estimated to be worth somewhere between three quarters and a million dollars by the will of the late Mr. Frank L. Hall, of Kansas City.

OBERLIN GRADUATE SCHOOL OF THEOLOGY has received a gift of $300,000 for a new building from John D. Rockefeller, Jr. It is the intention of the school to seek $200,000 more to increase the endowment and scholarship funds.

RODNEY SHARP, of Wilmington, has added $100,000 to a former gift of $250,000 made a few months ago for the erection of an auditorium for the University of Delaware.

GIFTS of $200,000 were announced at the close of the combined anniversary and commencement exercises of Abbot Academy at Andover, Massachusetts. Of this sum $160,000 was presented by President Constance Parker Chipman, '06, for the alumnae association and is to be known as the Alumnae Centennial Fund to be used to further worthy academic projects.

THE name of the donor who has provided $500,000 for a student union building on the new campus of the University of California at Los Angeles has been made public by Dr. Ernest C. Moore as Mrs. William C. Kerckhoff, widow of one of Southern California's pioneers and capitalists. The building, which will be known as the Kerckhoff Student Union building, is to be a memorial to Mr. Kerckhoff.

BOSTON UNIVERSITY SCHOOL OF THEOLOGY and the Garrett Biblical Institute are equal residuary legatees under the terms of the will of the late Lewis B. Alger, of Detroit. Each will receive in the neighborhood of $250,000.

APPROPRIATIONS for education by the State of Pennsylvania involve the expenditure of $94,000,000 during the next two years, an increase of $19,500,000 over the state aid appropriation for 1927–29. State teachers' colleges will receive $6,000,000 as compared to their appropriation for the last biennium of $3,000,000. Nearly $3,000,000 has been added to the appropriations for universities and colleges, the bulk of which will benefit the Pennsylvania State College. School districts will be reimbursed to the amount of $52,000,000 for common school expenditures, an increase of $4,500,000. A state education building also is to be erected at Harrisburg at a cost of $4,500,000.

THE daily papers report that Mayor Nichols, of Boston, rebuked the school committee when he returned its appropriation order for expenses for the current year without his approval and accompanied by the message that the committee's custom of appropriating in excess of requirements, in so far as it results in an unreasonable surplus, "is unfair to the taxpayer and ought to be discontinued." The mayor points out that the school budget of $15,407,891, exclusive of the additional appropriation order for alterations and repairs, is $827,596 above last year's expenditures. Taking into consideration the increased expenditures of the first five months of this year over a similar period last year, the mayor estimated that the school committee will have a surplus of $427,000 in the treasury on December 31. It is said that two

years ago, at the mayor's demand, the school board cut $200,000 from its budget and still had a surplus of more than $500,000.

A CHAIR to be called the George Eastman Visiting Professorship at Oxford University has been established by George Eastman, of Rochester, New York, with an endowment of $200,000 to the Association of American Rhodes Scholars. The endowment was named for Mr. Eastman by the Oxford authorities. The incumbent must be a citizen of the United States, distinguished educator or research man. He will serve at Balliol College for from one to five years and will be eligible to reappointment. His task will be to lecture and teach the subject in which he has distinguished himself. In speaking of the gift, Mr. Eastman is reported to have said: "In the long run, I believe cooperation and civilization will be most effectively promoted if nations and those who form public opinion in them know and understand one another. I am desirous of doing something that will assist Englishmen and Colonials, and particularly the group destined to play an important part in government, science, scholarship, journalism and industry, to understand America—to study the vast and important experiments we are making in almost every field and to use their knowledge to advance civilization."

DISCUSSION

CONCERNING OVERLAPPING OF PROFESSIONAL COURSES IN TEACHER-TRAINING INSTITUTIONS

THE courses offered in departments of education in teacher-training institutions are frequently criticized as to overlapping in content. The alleged duplication of material in two or more different subjects, for each of which credit is given, furnishes one argument in support of the contention that professional courses are not equal in college grade to those of the academic departments either of the same institution or of the liberal arts college, and that, therefore, the teachers college degree is not equivalent to a degree from other colleges.

The accusation of repetition of subject-matter is perhaps most frequently made against the well-established technical courses wherein, it seems fair to assume, overlapping should have been reduced to the minimum. The assumption, valid or not, makes perfectly clear the only defensible attitude for institutions that are intent upon building up the department of education; namely, elimination or combination of courses which, on rigid investigation, show gross duplication. But the indictment is also brought against subjects more recently added to the curriculum, the content and objectives of which are, quite naturally, less clearly defined and therefore furnish ready opportunity for overlapping, new into the old, old into the new.

This criticism and the conditions supporting it are particularly true of that relatively new subject designated by various titles, of which perhaps the most common is "educational measurements." Not only are the limits of this field vaguely defined, a fact attested by the conversation and actual practice of many teachers of the subject, but the content involved is peculiarly susceptible to appropriation by teachers of other professional subjects such as the various psychologies and method courses common to all teacher-training curricula. Some teachers of the course seriously question whether the field offers a sufficiently large body of distinct material to justify a separate course. They maintain that acquaintance with standardized tests should be and often is made in the various courses on the teaching of reading, arithmetic and the like, and that the statistical treatment of data is a prerogative of the department of mathematics.

These and similar opinions expressed in good faith have influenced the writer to investigate the worth-while-ness of the course she gives in educational measurements in the State Teachers College, Milwaukee—a course which she regards as essential in the training of a teacher since it is the natural and logical one in which to develop the scientific attitude toward, and approach to, the study of education and its problems. With this as the main goal, the course not only will utilize the more concrete aspects of the field, that is the study of standardized tests and the interpretation of the data they yield to the end that classroom teaching may

profit thereby, but it also should make a unique, direct and forceful contribution toward the attainment of the highest ends of all education, open-mindedness and independent thinking. These terms, often glibly quoted to idealize the work of the teacher, are not used here to epitomize an ethereal, mythical attainment. On the contrary, by the development of open-mindedness and independent thinking is meant the establishment of the habit of following logical thought processes in the study of school problems, wherein the tools of thinking, that is to say, ideas, are based upon the analysis of facts, not upon traditional opinion and practice, prejudice, superstition and the like. It means that conclusions, solutions, when accepted after due consideration of all phases of the question, will be regarded not as final, but tentative, subject to revision in the light of new objective evidence.

Applying this objective of the course to the evaluation of the course itself, the writer was constrained to make a simple investigation to collect evidence in regard to the amount of precourse knowledge of the subject which students bring to its study. This article deals with the experiment and its results.

A list of seventy true-false statements was submitted to forty-six students at the beginning of their course in educational measurements at the opening of the fall semester, 1928. This same list had been used as a part of the final examination given classes at the close of the course in previous semesters. From these former students a control group was taken consisting of the first forty-six on the class roll of the preceding semester, that is, the spring term, 1928. Since the mental ability of the members of the two groups was virtually the same, as that trait is measured by the Thorndike intelligence examination for high-school graduates which all students in the groups had taken in the freshman year; and since these students, all juniors or seniors, brought virtually the same type of previous academic training to this course, it seemed reasonable to infer that the main difference between the two groups in respect to knowledge of educational measurements would be due to the fact of having-had or not-having-had the course, and that, therefore, large overlapping in the two distributions of scores on this test would indicate a serious amount of overlapping of the content of this course with that of subjects taken previously by these students beginning the study; but that slight overlapping in the two distributions would indicate new knowledge and power gained from the course. The following comparison gives the results in condensed form.

Group I, range, 2 to 45; median, 18; sigma, 9.1
" II, " 31 " 58; " 43; " 5.8

This comparison of the data shows such a minimum of overlapping as is almost incredible. Moreover, inspection of the individual scores reveals that only two of the beginners made a score (34 and 45) as high as the lowest (31) of the control group. It should be added that these two scores were made by mature individuals, in C A, far above any other member of either group; both, teachers of experience; one of whom holds the A.B. from Northwestern University, and the other had a rich fund of information on tests and testing gleaned from the use of standardized material in his work as principal of a state graded school for three years. Thus it is seen that no *bona fide* beginner in the field scores as high as the lowest of those completing the course.

To investigate these results further, inspection was made of the record left by all former students who had taken this test as a part of the final examination at the end of the course. This brought out the fact that of 284 students who had received a passing mark in the course only sixteen made as low a score on this test as the highest (30) of the forty-four *bona fide* beginners.

These findings in no sense should be interpreted to justify sweeping conclusions. The important considerations of the relatively small population measured, the particular situation involved, the method of instruction, personality of the teacher—these and other elements are recognized as potent in their possible effect upon the results from any investigation in which classroom teaching is a conspicuous factor. Nevertheless it seems unquestionable that such a negligible amount of overlapping as is

revealed by the comparison of the two groups and further substantiated by the record of nearly three hundred students may safely be regarded as trustworthy evidence of one, or both, of two simple, but important, facts which every instructor should know of the courses he teaches: (1) it does not draw upon the prerogatives of other fields, and *vice versa*, the courses taken previously by these students do not trespass seriously upon the domain of this subject; (2) whatever the nature of the content as respects duplication, the course is training the students in a type of mastery not formerly acquired.

The findings furthermore strongly indicate that where there obtains a defensible charge of serious overlapping of this course with others, the real cause of such duplication is to be found in other quarters than that of legitimate content, and that the remedy should be sought not in belittling or discarding the course but rather in a comprehensive grasp of its potential significance in the training of prospective teachers.

From the results of this simple investigation it appears that it should be a relatively easy matter for the teacher of any course that bears the odium of harboring duplications in content to prove or disprove, more or less conclusively, the validity of such an indictment. A concerted effort to do an honest job of housecleaning on the part of departments of education should go far in proving to the academic world that teacher-training institutions are not only becoming colleges in the best sense of the name, but also are pointing the way all higher institutions must follow eventually if we are to keep pace with the elementary school in shuffling off the dead-wood of traditional courses and in the selection of new ones on a basis of objective facts gathered by the application of scientific methods to the study of curriculum.

LILIAN HUNSICKER
STATE TEACHERS COLLEGE, MILWAUKEE

THE ETHICAL TRAINING OF CHILDREN

THE discussion in our journals as to how children in our public schools are to be trained in ethical and moral ideas and ideals is very interesting. In the discussion the teachers seem to throw the burden on the parents, and the parents to put it on the day schools and the Sunday Schools, and to urge the establishment of week-day schools of religion.

In this fundamental requirement for maintaining an honest and law-abiding population, we must use not one alone but every possible agency. First and foremost comes parental influence, and this finds its most effective use in the power of example and the atmosphere of the home which is created by the behavior of father and mother, in their attitude to each other and to their children. A very young child, in fact one too young to go to school, will recognize deceit in word or act and will react by showing the same trait. Similarly the destructiveness of careless habits, bad temper and lack of self-control appear. Whatever rules or instructions a parent gives are of little value unless supported by example. The same principle holds in regard to the teacher. No amount of technical training can take the place of fine character, high ideals and the atmosphere created by the personality of the teacher. With all due regard for the multitudes of noble-minded teachers in our schools, there is still need for the correction or the removal of those whose example is not uplifting and whose influence thus tends to nullify that of the high-minded.

A very helpful and easy way to instil high ideals in the schoolroom is to have a fine quotation written at the top of the blackboard or posted in some suitable place every day, or once a week, using appropriate ones for national holidays or special community events. There is, I believe, no question but that the vast majority of intelligent persons consider religion an essential factor in maintaining high ethical standards in face of the stress of temptation and bad example met with in daily life. Here, again, the religion of the home has the greatest influence, and that shown in the life more than belief or words. No hypocrisy can deceive the keen eyes of the young. The school, too, must have its influence. The fundamentals of religion, the "Fatherhood of God and the brotherhood of man," are justly recognized in the schools of a nation whose coins bear the words, "In God we trust." That true religious ideals may be presented without giving offence to

sectarian ideas has been proved in many private educational institutions. In this matter the intelligence, sympathy and skill of the principal and his assistants are of essential importance.

A good Sunday School will help out the lack often found in home and school training. But for the millions who can not or will not attend Sunday School, surely the week-day school of religion, if it can attract them and give fine atmosphere as well as fine instruction, is greatly to be desired.

EMILY RAY GREGORY

SPECIAL CORRESPONDENCE

VIRGINIA POLYTECHNIC INSTITUTE'S SERVICE TO THE STATE

SERVICE to the state is a vital part of the program of Virginia Polytechnic Institute, for it has undertaken to advance in a very material and practical way the growing industrial development of Virginia. No longer is the institute content to confine its efforts—important as they are—to classroom instruction, but it intends to place its resources for research and experimentation at the disposal of business, both large and small.

The service of the institute is being offered in numerous spheres, but the ones which were started this fall relate particularly to the ceramics, wood utilizing and rayon industries, and to communities desiring industrial surveys. Three men were added to the faculty this year with the primary purpose of carrying on this work.

The way in which the engineering experiment station and the engineering extension division will serve the state is explained by Dean Earle B. Norris:

> Through the engineering experiment station the laboratories in engineering and the allied sciences are used for studies of Virginia's natural resources and the technical problems of her industries. The departments of geology, mining engineering, chemical engineering, ceramics and wood technology are among those especially interested in the development and conservation of the resources of Virginia: development, by laboratory studies which seek to find economic methods of utilizing untouched resources; and conservation, by studies which search for better methods of utilization, whereby there may be improvements in quantity or quality of output or a reduction in the cost of production.
>
> Some of the larger industries are able to maintain their own scientific staffs and laboratories, but even then occasional problems arise for which special equipment or facilities are needed or upon which outside scientific thought or advice is desired. The greatest opportunity for research service, however, appears to be in aiding smaller industries which are unable each to maintain its own research facilities. In many such cases groups or associations of industries in certain affiliated lines might join in the maintenance of research in fellowships for the study of their particular problem.
>
> In order that our research and instruction may be effectively guided, it is important that we know our industries and their problems, as well as the technical problems of our civic and governmental organizations.
>
> The engineering extension division is therefore set up as a service and contact organization to bring the facilities of the school of engineering into action in the service of the commonwealth.

The ceramic industries of Virginia are being surveyed by John W. Whittemore, who came to the Virginia Polytechnic Institute from Louisiana State College, where he made some important studies in Louisiana clay for the conservation commission of that state. Ceramic industries, especially in heavy clay products, are already of some importance in Virginia and are capable of great development, but thus far little has been done to develop the real possibilities of Virginia's ceramic resources.

In addition to the tabulation of ceramic resources, Professor Whittemore will study such industries as the manufacture of brick, drain tile, hollow building tile, sewer pipe, floor and wall tile, roofing tile, fire, brick, and similar refractory articles, dishes, glassware, enameled metals, abrasive wheels, pottery and cements. Tests of both the finished product and raw material from which the product is made have been made available to manufacturers. This survey will serve as a basis of courses in "ceramic materials," "ceramic technology,"

"ceramic manufacturing," which probably will not be given before next year.

Another service being offered industry in Virginia primarily affects wood-working industries, for Dr. J. E. Lodewick, formerly of the New York State College of Forestry, is at present conducting a state-wide survey in wood technology. The amount and kinds of wood in various sections, how best it can be utilized by local industry to obtain the best product at the lowest cost, and a careful plan of keeping the supply of raw material replenished are being studied by Dr. Lodewick in his investigation of the state, which is expected to take nearly a year to complete. Already Dr. Lodewick has done the field work in nearly all the counties. In all cases he has found excellent cooperation on the part of manufacturers, in several instances confidential data being freely furnished. In order to protect such, tabulations will not be published until the entire state has been studied.

The information thus gained will be used as a basis for courses in "wood technology," "industrial wood-fibers," "wood-using industries in Virginia," "forest products," which will be offered as part of the training of engineers who expect to enter this field.

One of the most important services being offered for the first time by the institute is an industrial survey of small cities. Reuben L. Humbert, who until August, 1928, was secretary of the Harrisonburg, Virginia, Chamber of Commerce, was added to the staff with the expressed purpose of making industrial surveys. While at Harrisonburg, Professor Humbert made a survey of that city of 7,000 persons, which has been used as a model all over the country for surveys of cities, some several times the size of Harrisonburg.

More than a score of Virginia cities have asked that the survey be made. The first one, made at Wytheville, has just been printed, while the field work of the Tazewell, Christiansburg-Cambria and Suffolk surveys has been completed. When a city asks that this semi-technical survey be made, members of the institute staff who are experts in gathering industrial data go there and determine such essential information as the number of industries already there, the kind, the number of persons engaged, the amount of weekly payrolls and what inducements are offered for a new industry to locate there.

In addition to this, certain primary factors, such as climate, amount and kind of raw materials, natural resources, type of labor, average wages offered, working conditions prevailing, living conditions, amount of power and its cost, kind of freight and express transportation, type of schools and churches, development of recreational facilities and the tax rate are tabulated. Other factors studied are municipal improvements, such as sewerage, water, light, police and fire protection. The type of hotels, restaurants, groceries and commercial establishments, newspapers, telegraph and postal facilities often influence new industries either to come or go elsewhere, so because of this such facts are given important consideration by those making the survey.

Major R. B. H. Begg, professor of civil engineering and director of the engineering extension division, and T. W. Knote, professor of business administration, have taken an active part in securing information. When the data have been gathered, the staff returns to the college, where all of the information is tabulated and printed in booklet form for the community. The only expense to the community is that of printing and distributing the booklet.

Producing rayon in the chemical laboratory of the institute will be part of the work of the present academic year. Equipment has been ordered and class work was started in January, in an effort to assist an industry nearly half of which is located in Virginia. Development of students trained in rayon productions is the primary object of this course. Dr. Robert E. Hussey, associate professor of chemistry, who gives the new course and supervises the manufacture of rayon on a small scale in the college laboratory, explains that the new course, which is believed to be the first of its kind in the country, includes lectures and laboratory work by covering the chemistry of cellulose, the basic principles involved in the manufacture and finishing of rayon and the chemistry of these processes, a study of raw materials used and the various factory tests.

Students will be required to produce rayon from the raw material during the course, and besides the actual instruction those in charge

of the course are planning to conduct research work on rayon production and to keep in touch with the various rayon plants in the state.

In making industrial surveys, especially of smaller cities; in studying the wood technology and ceramic industries; in training rayon engineers and conducting research on this product; in making scientific tests especially for the smaller industries, Virginia Polytechnic Institute is directly serving the industries of its state, as well as training in the classroom the leaders of the future. Classroom work and practical assistance, research and application are being happily wedded.

R. H. MCNEIL
VIRGINIA POLYTECHNIC INSTITUTE

REPORTS

THE RELATIONS OF THE NATIONAL GOVERNMENT TO EDUCATION[1]

PLANS for a study of the present relations of the National Government to education, to aid enactment of remedial legislation were discussed on June 7 by the Advisory Committee on Education, comprising representatives of national educational organizations, who met at the call of the Secretary of the Interior, Ray Lyman Wilbur.

In convening the conference, Secretary Wilbur outlined its scope and purpose. He announced that Charles R. Mann, director of the American Council on Education, was appointed general chairman of the advisory committee, and that J. W. Crabtree, of the National Education Association, was appointed general secretary. For the chairmanships of the three subcommittees, Secretary Wilbur appointed Dr. James E. Russell for the committee to consider the educational activities of the United States Government; President Lotus D. Coffman, of the University of Minnesota, for the committee to consider subsidies of the Federal Government to colleges, and Frank Cody, superintendent of the Detroit schools, for the committee to study other subsidies now granted.

Dr. Mann, in formally opening the discussions, outlined the present scope of government participation in education. He said that the task confronting the conference is "very difficult" because the whole question of organization of education in the Federal Government "is pretty well loaded with dynamite, as any one knows who has lived here and observed operations for any length of time."

The advisory committee adjourned without setting a date for another general meeting, after receiving reports from the three subcommittees indicating that they would be unable to formulate definite plans before next fall.

The chairmen of the subcommittees said they proposed to designate individual members to secure data to guide the groups in their further deliberations. By vote of the conference such a plan was agreed to, with the future procedure to be settled by a conference committee headed by Dr. Mann, and composed of three members of each subcommittee.

Dr. Mann said that Secretary Wilbur did not expect an early report, but preferred to have the advisory committee work out its plans in detail with a unanimity of opinion, even if it takes a year. All these factors, he said, should be left to the conference committee to decide.

The conference adjourned and the conference committee convened immediately to consider its preliminary plans.

When the meeting was called to order the Secretary of the Interior, Ray Lyman Wilbur, made an address of welcome. Dr. Charles R. Mann, director of the American Council of Education, who presided, made an introductory statement of the problems to be studied. The United States Commissioner of Education, William John Cooper, called attention to a list of official documents presented on various phases of education.

The conference considered Federal subsidies to education at college level, a paper on which was presented by Dr. Arthur J. Klein, chief of the division of higher education of the U. S. Bureau of Education, and to subsidies to education of less than college level. A paper on the latter subject was presented by Dr. J. C. Wright, director of the Federal Board of Vocational Education.

[1] Based on the report in the *U. S. Daily*.

Dr. Wright discussed in particular the crystalizing of public sentiment which resulted in the enactment of the Smith-Hughes Act for vocational education of less than college grades and traced the growth of vocational education since the law went into effect. The amount of State and local money for vocational education, he said, has been increasing much more rapidly than Federal funds.

The conference later divided into three groups to study various phases of education.

Group No. 1 will consider educational activities of the United States Government. This group consists of James E. Russell, chairman; S. P. Capen, W. M. Davidson, Frank P. Graves, J. C. Merriam, W. F. Willoughby, W. S. Thayer, Lois H. Meek, Lita Bane, George D. Strayer, Belle Sherwin, Walter L. Crocker, George Johnson, Mrs. F. P. Bagley.

This committee will give consideration in its studies to the following suggested issues:

On the basis of the present educational activities of the Federal Government and of their present administration, what are the next steps towards better organization for the future?

1. State the principle of local autonomy or decentralized responsibility.

2. What types of Federal activity strengthen local autonomy and responsibility? What types weaken them?

3. What organization of Federal educational activities best insures limitation of Federal activities to types that strengthen local autonomy?

4. What reorganization of present Federal activities in education best insures their effective coordination?

Group No. 2 will consider the subsidies of the Federal Government in colleges, their administration, results obtained and future policies. This group consists of Lotus D. Coffman, chairman; James R. Angell, Harry W. Chase, George H. Denny, Edward C. Elliott, Uel W. Lamkin, Cloyd H. Marvin, W. P. Morgan, Rt. Rev. Edward A. Pace, D. W. Springer, Mary E. Woolley, George F. Zook, Lida Lee Tall, E. P. Cubberley.

The list of suggested issues for this group to study is as follows:

On the basis of present Federal subsidies to colleges, of present administration, and of results obtained, what are the best policies for the future?

What is the procedure in paying these subsidies to colleges, disbursing them by colleges and auditing accounts?

What is the procedure in selecting candidates for subsidized positions, employing them and supervising their activities?

What constitutes an official appointment authorizing payment of Federal money for salaries?

Recognizing the value of Federal support in starting new enterprises, what are the present conditions that justify continuation of Federal subsidies?

When Federal subsidies were established, Federal taxation was indirect. What is the justification for continuing and extending these now that two-thirds of Federal taxes are direct income taxes?

What is the justification of Federal support of State engineering experiment stations?

What evidence shows whether Federal subsidies are or are not weakening local responsibility?

Group No. 3 will consider subsidies granted for education of less than college grade, how administered, results obtained and suggestions of future policy. This committee group consists of Frank Cody, chairman; J. B. Edmonson, Charles H. Judd, Mrs. S. M. N. Marrs, A. B. Meredith, Carl H. Milam, W. B. Munroe, W. F. Russell, Guy E. Snavely, William Green, T. E. Finegan, Mrs. L. W. Hughes, Mrs. Edith B. Joynes, Miss Agnes M. Samuelson, R. L. Cooley, Maurice Bisgyer.

The list of suggested issues for this group to study is as follows:

On the basis of present Federal subsidies to education of less than college grade, of present administration, and of results obtained, what are the best policies for the future?

What is the procedure in paying these subsidies to colleges, disbursing them by colleges and auditing accounts?

What is the procedure in selecting candidates for subsidized positions, employing them and supervising their activities?

What constitutes an official appointment authorizing payment of Federal money for salaries?

Recognizing the value of Federal support in starting new enterprises, what are the present conditions that justify continuation of Federal subsidies?

When Federal subsidies were established, Federal taxation was indirect. What is the justification for continuing and extending these now that two-thirds of Federal taxes are direct income taxes?

What is the justification of Federal support of State engineering experiment stations?

What evidence shows whether Federal subsidies are or are not weakening local responsibility?

On the basis of present Federal subsidies, what are the advantages and the disadvantages of gradually reducing and ultimately withdrawing Federal subsidies to a State as the State appropriations for the specified purpose increase?

In addressing the meeting Secretary Wilbur said:

The problems before you are more or less familiar to you all. They are fundamental—particularly fundamental to this country. Education has a unique significance in this republic. It has had a great history. The question is what shall its future history be in so far as the National Government is concerned. There has been since the very beginning here in the United States marked local development of the public school system, but we have had certain things develop in the National Capital and in different parts of the country. In the Department of the Interior, through the so-called Bureau of Education, there has been an attempt made to get a certain leadership in American education.

I think that while the history of that Department is somewhat checkered, on the whole it has done many good pieces of work and has provided sound leadership. But those of us who have studied it lately have felt that there is a great deal more that can be done. We have endeavored to increase the responsibility of the office by elevating somewhat the Commissioner of Education and by making room for an assistant commissioner of education. We are trying to find a suitable woman for assistant commissioner of education. It does not seem to be easy. Perhaps if we had left out the word suitable, we should have had no difficulty. No doubt, after I have mentioned it here, there will be a good many candidates. We want a first-class woman, for women, as you know, play a very important part in American education.

Aside from the activities of the bureau, certain responsibilities have been accepted in the Government for types of education of vocational character and otherwise. We feel that a very careful study should be made since there is a tendency at the present time in this country to bring to Washington all the various problems of the various parts of the country. If the Mediterranean fly makes trouble in Florida, there must be a resolution with appropriations passed by Congress. If an Act of God takes place in Oklahoma, and takes the form of a flood, Congress is expected to give relief. In other words, Congress is being looked upon as a sort of glorified Red Cross agency in many parts of the country.

There should be a limit to things of that kind—particularly in the field of education.

I want to express my appreciation of the fine spirit and interest which you all have shown. I doubt if there is any other field in the United States where one could send out as we did a considerable number of invitations, and not have a single declination. Some felt they could not come to the first conference, but expressed a desire to serve on the group.

If this committee can continue in the spirit in which it has begun, I feel that a historic document will finally be presented by Chairman Mann, to whom I now turn over the meetings.

QUOTATIONS

THE GOVERNMENT AND EDUCATION

SECRETARY WILBUR has declared that a separate Federal Department of Education with representation in the cabinet is not required, but has promptly taken steps toward assembling through expert assistance information about the results of the present educational activities of the federal government, with advice as to future policies. This is a much-needed study. It is fortunate that the Secretary of the Interior is himself so highly qualified to give general direction to the inquiry and to avail of its conclusions.

A joint committee of Congress on the reorganization of the executive departments made an extensive survey some years ago. It found that hardly a session of Congress passed without legislation creating new agencies, transposing old ones, or imposing new or larger duties, and that nearly every year some executive department organized a new bureau or division for carrying out the new requirements. Congress, for example, passes an insecticide and fungicide act and an Insecticide and Fungicide Board is forthwith set up. This great expansion has resulted in more or less duplicated or

unrelated effort. The tendency was intensified during the war. Scores of new agencies came into being, some with departmental affiliation and many as virtually independent establishments. The number of employees in departmental service was trebled between June, 1916, and November, 1918.

The survey planned by Secretary Wilbur has a narrower range. It is concerned only with education. There was a chart in an outer room of Mr. Hoover's office when he was Secretary of Commerce showing the distribution of scattered functions throughout the departments—and some beyond. There are curious, not to say amusing incongruities. The mind of President Hoover has doubtless pondered over this chart. But the new committee will not only bring within view these varied educational activities, but will also consider projects under state or other control which receive subventions from the federal government. The personnel of this advisory committee is of the highest and gives promise that when the report comes it will be one on which an educational engineer can confidently build a system without duplication or waste—in which there will be a unifying of the federal educational agencies and a centralizing of the sources of information, without impairing local initiative and responsibility.—*New York Times.*

INTER-AMERICAN EDUCATION

UNDER the sponsorship of the National Education Association there is in process of formation an Inter-American Federation of Education Associations that promises to play an important part in the cementing of friendship between the nations of North and South America. Contacts are being established with all the Pan-American republics, either through representative educational associations or through the ministers of education of the various republics. In July there will be held at Atlanta an inter-American conference of education in which leading Latin-American educators will participate, and during which the aim and plan of the federation will be discussed. During the summer of 1930 a preliminary organization congress will be held at a Latin-American capital. The contacts thus far established definitely assure the creation of the federation.

In discussing, in connection with the creation of the federation the universal desire for understanding and accord among the peoples of the American continent, Dr. Glen Levin Swiggett, organizing secretary of the federation, speaks as follows: "Of all human interests, education is best fitted to promote fellowship. Political accord and mutual economic advantage can only come with informed public opinion and helpful technic which education alone can form and foster. 'It is for this reason that ministers of education in all participating countries have promised their cooperation, and the accredited representatives of these countries in Washington have given assurance of their interest and support."

The United States and the Latin-American nations will benefit alike through the creation of an Inter-American Federation of Education Associations. Matters of general concern can best be approached in a spirit of cooperation. Problems of individual interest can best be solved by bringing to bear the combined experience of the group. Isolation will be fought through the federation, and all the American nations brought to a more complete realization that they have so much in common that cooperation is not only desirable but necessary. The Inter-American Federation of Education Associations once established should develop into a powerful agency of good-will.—*Washington Post.*

EDUCATIONAL RESEARCH AND STATISTICS

ELUSIVE FACTORS TENDING TO REDUCE CORRELATIONS BETWEEN INTELLIGENCE TEST RANKS AND COLLEGE GRADES

FOR some years now investigators have been studying the predictive value of intelligence tests (or aptitude tests) for college freshmen. Their results have been expressed usually in terms of the coefficient of correlation, and not infrequently no other facts were considered. Few of the coefficients have been found to be greater than .60, and many were .50 or smaller.

Taken at their face value, these coefficients may be interpreted as being of marked significance because the correlations of college grades themselves for the same group of students from term to term are frequently no higher; or else because entrance examinations and secondary-school records seem to be somewhat less significant as criteria of college success, judged on the basis of correlations. These same coefficients of correlation, interpreted by one with a different bias, may be regarded as lacking significance because they are so far removed from unity or from a value approximating unity. Thus the evidence appears to be not unequivocal.

However, more recently, investigators of this problem have studied additional data, such as the number of hours spent in study (each day or week, or whatever the unit) and the number of honor points achieved. Thus, having three or more variables, the partial correlation and regression technique can be employed. Using this technique, it can be demonstrated, for instance, that with hours of study constant, the correlation between general intelligence and honor points is very high. Likewise it can be shown that when intelligence is constant, the correlation between the number of honor points and hours of study is almost as high.[1] The conclusions to be drawn from such data are clear. These same partial coefficients may then be employed in the derivation of a regression equation; and this equation, in turn, may be used to predict (within limits of error) the number of honor points a student will most likely achieve if his intelligence rating is known, together with the number of hours spent in study, per unit of time. If it were desired, numerical grades could be substituted for the number of honor points, and thus it would be possible to predict (within limits of error) a student's most likely average. But these predictions in any event would be dependent upon the reliability of the coefficients of correlation.

Data perhaps more useful than coefficients of correlation would be tables of chance based on the intelligence test rank and on college grades achieved over one, two or three or any number of semesters. Hence it would be possible to say that for a student ranking in the highest decile the chances for completing one, two or more years with a given grade are such and such; for a student in the second decile, the chances are such and such. Similarly, for students ranked in the lowest decile or quartile, or at any of the intermediate levels, the chances for successful completion of one or more years and for the achievement of certain grades can be stated.

Yet there are numerous factors contributing toward success or failure which are extremely difficult, if not impossible, of measurement for purposes of quantitative analysis. Among these elusive factors are interest in the work, motivation, extra-curricular activities, time spent in working for a living, health, disturbances of various sorts, time spent in study and reading independent of courses, poor habits of study, etc.

Because these are factors not capable of quantitative measure, and because they tend to lower the coefficients of correlation, is it to be concluded that the intelligence or aptitudes test is of less value? Quite the contrary seems true. Decreased correlations are due, of course, to the discrepancies which exist between rank in the intelligence test and rank in scholarship. But where significant differences do appear, some clear reason can usually be found for their presence. If this be so, then the discrepancies do not lessen the value of intelligence tests, providing that a careful study is made of individual cases where significant differences do exist.

In order to determine whether such clear reasons are usually present, sixty-eight sophomores were interviewed. These were students who fell in one of two groups: (1) those who ranked in the upper 30 per cent. on the intelligence tests, but who averaged less than 75 in their courses of the freshman year; (2) those who ranked in the lower half on the intelligence test, but whose freshman scholastic averages placed them in the upper 30 per cent. of their class. Of the former there were forty-two, and of the latter twenty-six. The freshman class numbered about 450. The test used was that published by the American Council on Education. It is felt that the testimony of these

[1] For example, M. A. May, "Predicting Academic Success," *Journal of Educational Psychology*, 1923, XIV, 7, pp. 429–440.

students is in every case reliable, for they were told that the information in no way affected their records in the college, and that we were merely seeking information by which to be guided.

Taking the first group—those whose scholastic records were poorer than the intelligence test results would lead us to expect—it was found that the reasons for their relatively poor scholarship could be grouped as shown in Table I. It will be noted, of course, that the total of the F column is greater than forty-two, for many students had more than one explanation to offer.

TABLE I

	F
Lack of interest	15
Poor habits of study	11
Loafing	8
Athletic competitions	7
Extra-curricular competitions	5
Work for self-support	5
Reading and study outside of courses	4
Social activities	4
Illness	1
No apparent reason	4

Only few of these need elaboration. The first reason—lack of interest—was given by students who were frequently doubtful of the wisdom of coming to college or who came into their courses without purpose and without any desire to study for the sake of study alone. The second—poor habits of study—includes such things as unfamiliarity with the lecture method, poor allotment of time and difficulty of adjustment to self-responsibility, as compared with the rather close supervision in the secondary school. There was also a small group who maintained that they did only enough in their courses to get a passing grade, but that they spent much of their time in reading books far afield of their courses.

The second group—composed of those whose intelligence test ranks were markedly below the level of their scholastic achievement—had the following reasons to offer for their poorer performance on the intelligence test.

TABLE II

	F
Newness of conditions and nervousness during first days	15
Attached no importance to test	10
Handicapped by time limit	6
Illness	5
No apparent reason	1

With these freshmen the intelligence test is not used as a basis for admission: the test is given to students who have already entered, but it is administered during the first few days, when the strangeness of the new situation is very marked, and when many a freshman is still in an unsettled state. There is also a small group who felt that inasmuch as they had already been admitted to the university, their maximum effort was, therefore, not necessary. However, this unfortunate attitude frequently originates not with the freshman himself but rather with some of the upperclassmen, the self-constituted advisers of incoming students.

Although it seems to be established that power and rate are very highly correlated and that they are, therefore, both functions of "general intelligence," there is nevertheless a small group who find time limits a handicap. They are the very small minority of slow, careful individuals who have probably given rise to the popular but erroneous belief that the slow worker is the more able and the rapid worker superficial and inaccurate. Yet the presence of this minority will to some degree lower correlations between intelligence tests and college marks, because the time factor is not nearly so effective in course work and course examinations, whereas it is an element of importance for some in taking the aptitudes test.

The correlation technique—including partial and multiple correlations—together with the regression equations, is of unquestionable assistance in studying predictive values; but it should also be clear that there are sufficiently frequent elusive factors which make it necessary, for a better understanding of a test's predictive value, to supplement the objective data with subjective reports in those instances where discrepancies exist between test rank and course grades.

FRANK S. FREEMAN
CORNELL UNIVERSITY

	F
	15
	10
	6
	5
	1

ed, but
days,
ion is
nan is
also a
ey had
their
ssary.
uently
f but
e self-
s.
power
that
eneral
group
re the
duals
pular
is the
l and
ority
ween
e the
ourse
is an
g the

rtial
the
as-
ut it
ently
sary,
ctive
with
dis-
urse

N